

WHAT IS CLAIMED IS:

1 1. A method for acquiring operating parameters in a communications system operable to
 2 transmit a data signal, the method comprising the steps of:

3 generating at least one operating parameter carrier having a frequency value in a vicinity
 4 of a null of a data spectrum of the data signal;

5 modulating the at least one operating parameter carrier;

6 summing the operating parameter carrier with the data signal;

7 transmitting the summed signal; and

8 recovering the at least one operating parameter carrier from the summed signal.

1 2. The method of claim 1 wherein the generating step generates at least another operating
 2 parameter carrier having another frequency value in the vicinity of the null of the data spectrum.

1 3. The method of claim 1 wherein the communications system comprises at least one optical
 2 channel.

1 4. The method of claim 1 wherein the at least one operating parameter carrier is a sinusoid.

1 5. The method of claim 1 wherein the data spectrum of the data signal comprises a plurality
 2 of nulls, the method comprising the further steps of:

3 generating at least another operating parameter carrier having a frequency value in
 4 another of the plurality of nulls; and

5 summing the another operating parameter carrier with the data signal,

6 wherein the recovering step recovers the another operating parameter carrier.

6. The method of claim 5 wherein the communications system comprises a wavelength division multiplexed communications system.

7. The method of claim 6 wherein the data spectrum is an RZ spectrum.

8. The method of claim 6 wherein the data spectrum is an NRZ spectrum.

9. The method of claim 8 wherein the demodulating step includes the further steps of:
transmitting RZ format data; and
recovering NRZ format data from the RZ format data.

10. The method of claim 1 further comprising the step of bandwidth limiting the at least one operating parameter carrier.

11. The method of claim 1 wherein the demodulating step further includes the step of bandwidth filtering the summed signal.

12. A method for optical channel operating parameter acquisition in a communications system operable to transmit an NRZ data signal, comprising the steps of:
determining a spectrum for the NRZ data;
generating a first sinusoidal operating parameter carrier having a frequency at a first null in the spectrum and a second sinusoidal operating parameter carrier having a frequency at a second null in the spectrum, the second null being successive to the first null in the spectrum;
summing the first operating parameter carrier, the second operating parameter carrier and the NRZ data signal;
transmitting the summed signal; and
at a receiver, recovering the operating parameter carriers from the summed signal.

1 13. The method of claim 12 wherein the optical operating parameter carriers are modulated
 2 by NRZ operating parameter data, the method comprising the further steps of:
 3 representing the NRZ operating parameter data in RZ format;
 4 modulating the first carrier with the RZ format data; and
 5 modulating the second carrier with the RZ format data,
 6 the recovering step including the step of processing the RZ format data to provide NRZ
 7 operating parameter data.

1 14. The method of claim 12 wherein the recovering step includes the step of bandwidth
 2 filtering the summed signal.

1 15. A communications system comprising:
 2 a channel;
 3 a transmitter for transmitting a data signal, the data signal having a spectrum, the
 4 transmitter including:
 5 an operating parameter carrier generator operable to provide an operating
 6 parameter carrier at a frequency having a value in a null of the spectrum; and
 7 a summer for summing the operating parameter carrier and the data signal,
 8 wherein the transmitter transmits the summed signal over the channel; and
 9 a receiver for receiving the summed signal, the receiver operable to recover the operating
 10 parameter carrier.

1 16. The communications system of claim 15 wherein the spectrum includes a plurality of
 2 nulls, the generator operable to provide another operating channel parameter carrier having a
 3 frequency in a successive one of the nulls.

1 17. The communications system of claim 16 wherein the operating channel parameter
2 carriers are sinusoidal.

1 18. The communications system of claim 15 wherein the receiver includes a bandwidth filter
2 for recovering the operating parameter carrier.

1 19. The communications system of claim 15 wherein the transmitter includes a filter for
2 bandwidth limiting the summed signal.

1 20. The communications system of claim 15 wherein the channel includes an optical channel,
2 the summer including an optocoupler.

1 21. The communications system of claim 20 wherein the communications system implements
2 WDM.

1 22. The communications system of claim 21 wherein the data signal is an NRZ data signal.

1 23. The communications system of claim 22 wherein the spectrum includes a plurality of
2 nulls, the generator operable to provide another operating channel parameter carrier having a
3 frequency in a successive one of the nulls.

1 24. The communications system of claim 23 wherein the operating channel parameter
2 carriers carry RZ format parameter data, the receiver further including a processor for providing
3 NRZ format parameter data from the RZ parameter data.

1 25. The communications system of claim 15 wherein the operating parameter carrier is a
2 sinusoid.

1 26. A communications system operable to transmit over an optical channel, comprising:

2 a transmitter for transmitting a data signal, the data signal having a spectrum, the
3 transmitter including:

4 an operating parameter carrier generator operable to provide a first sinusoidal
5 operating parameter carrier and a second sinusoidal operating parameter carrier, the first carrier
6 having a frequency located in a null of the spectrum and the second carrier having a frequency
7 located in a successive null in the spectrum, and

8 a summer for summing the operating parameter carriers and the data signal,
9 wherein the transmitter transmits the summed signal over the channel, the carriers being
10 modulated by NRZ operating parameter data; and

11 a receiver for receiving the summed signal, the receiver including:

12 a demodulator operable to recover the operating parameter carriers; and

13 a processor for providing NRZ operating parameter data from the RZ operating
14 parameter data.